

Chapter 4

What It Takes to Join an International Value Chain: The Firm-Level Evidence

The previous chapter examined factors affecting global value chain participation that are mostly external to the firm, such as the role of a country's transport infrastructure or the quality of its contracting institutions. Now we turn to determinants of GVC accession that are specific to the firms themselves, such as skills and capabilities. The theme of this chapter is that participation in international production networks typically demands skills and capabilities that often exceed levels found in firms that only serve the domestic market. While firms are responsible for the development of their own capacities, they also face constraints in attaining these capacities that include lack of information and coordination. In this chapter we discuss policy options for reducing these constraints.

No Ordinary Firms

The literature on GVCs has emphasized that firms in global production networks are usually associated with critical firm capabilities. Incentivized by the prospects of receiving a contract from a global buyer, potential suppliers may undertake improvements on their own (Javorcik, 2008). Once they join an international production network they may continue to acquire knowledge and experience from their buyers (Humphrey & Schmitz, 2002; Schmitz, 2006; Schmitz & Knorringa, 2000). As a result of this knowledge, and since they are required to have higher competencies, these firms tend to produce goods of higher quality than other firms in their countries.

An increasing number of case studies have shown that access to a global production network is indeed associated with the acquisition of critical capabilities and high-quality goods. Analyses have been carried out in many sectors, including apparel (Gereffi, 1999), motorcycles (Fujita, 2011), agroindustry (Cafaggi et al., 2012), and the computer industry (Kawakami, 2011). In this section we provide

additional systematic evidence showing that participation in production networks is associated with improved competencies and higher-quality goods.¹

The section that follows combines a detailed dataset of multinational companies with plant-level data from Chile to analyze the performance of affiliates of multinationals located in that country that provide inputs to their parent firms in other countries (vertically integrated affiliates). The aim is to determine whether these firms have an edge in capacities and outcomes compared to other Chilean firms. The argument is that suppliers in global production networks need superior capabilities to successfully perform in value chains, and these capabilities should be evident in a number of firm characteristics. Several caveats are in order here. First, the evidence we are presenting is for one country and cannot automatically be applied to other countries. Second, the challenges for acquiring capabilities are likely to differ between affiliates of multinationals and independent suppliers. Again, this requires some caution before generalizing the results to all types of suppliers. We will review below a number of additional analyses developed for other countries and for different types of suppliers and discuss how the results compare to those shown here. Finally, the exercise does not intend to establish causality between the formation of capabilities and participation in GVCs, but only correlations. Additional material presented later in the chapter will examine the nuances behind the relationship between GVCs and the acquisition of capabilities.

We start by analyzing whether vertically linked affiliates have superior capabilities relative to other firms in the country with respect to size, share of skilled labor, and level of total factor productivity.² A proper examination of these factors must compare these attributes across firms in similar sectors. To this end we run an econometric model that meets this requirement. The estimation also includes a variable that controls for whether the firm is an affiliate of a multinational company or not. This allows us to separate the potential effect of ownership from the effect of belonging to a GVC. Detailed information regarding the econometric model and the data sources appear in appendix C “Specification for Measuring the Performance of Vertically Linked Affiliates”.

We first compare the vertically-linked affiliates with all the other firms in the survey, which include other exporters as well as non-exporters. The results are shown in Fig. 4.1 (dark brown bars). Vertically linked affiliates compare more favorably than the rest of the firms in all three variables: they tend to be larger, employ

¹This is related to a more general discussion in the trade literature about the productivity effects of exporting. According to this literature, firms may undertake substantial investment to improve performance prior to exporting, and they may also improve their performance (productivity) after entering export markets (see, e.g., Alvarez & López, 2005; Aw, Chung, & Roberts, 2000; Bernard & Jensen, 1999, 2004; Clerides, Lach, & Tybout, 1998; De Loecker, 2013; Fernandes, 2007; Harrison, 1994; Pavcnik, 2002).

²In recent trade models, productivity is the single factor that captures the capability of the firm to export successfully (see Arkolakis, 2010; Bernard, Eaton, Jensen, & Kortum, 2003; Chaney, 2008; Melitz, 2003).

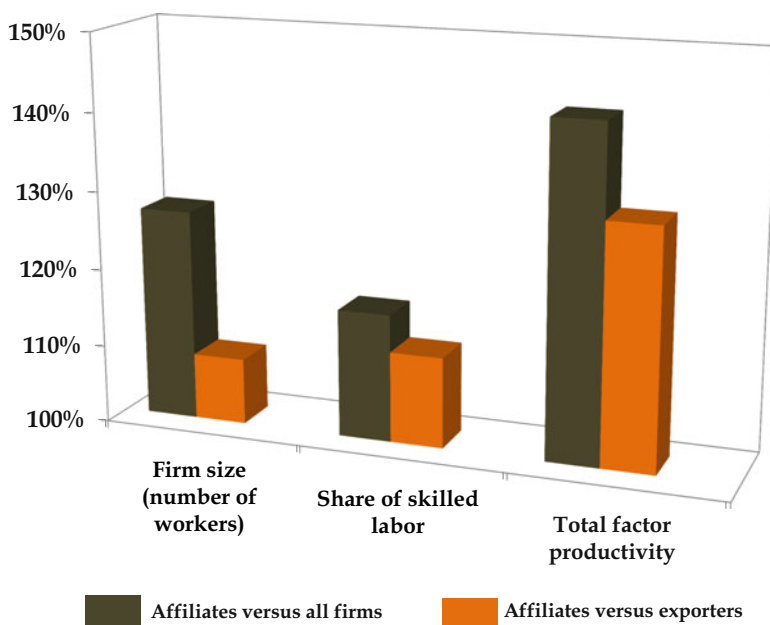


Fig. 4.1 Comparison between vertically-linked affiliates and other firms across various characteristics, Chile. *Source:* Authors' calculations

about 27 % more workers, have 16 % more skilled workers, and have 42 % higher total factor productivity. Then, we compare the vertically linked affiliates with only the exporters (orange bars); as the figure shows, their superiority over the exporters is slightly lower than before, but it remains present in all three variables.

We also compare export outcomes of vertically linked affiliates in terms of the following variables: total value of exports, number of products exported, and average exports per product. Once again, we compare firms in similar sectors (see appendix C “Specification for Measuring the Performance of Vertically Linked Affiliates”). The results are shown in Fig. 4.2: vertically linked affiliates demonstrate stronger export performance than the rest of the exporters. For instance, vertically linked affiliates have around 82 % more exports, export about 17 % more products, and have 32 % more exports per product than the other exporters.³ The general evidence, then, indicates that the vertically linked affiliates have superior capabilities and outcomes compared to the other exporters.

It is worth mentioning that the effects we found in terms of GVC participation are different from those associated with foreign ownership (see Appendix C “Specification for Measuring the Performance of Vertically Linked Affiliates”).

³We also compared the two groups in terms of export unit values as a measure of quality and found no significant differences. It has been noted, however, that export unit value is an imperfect measure of quality (Hallak & Schott, 2011).

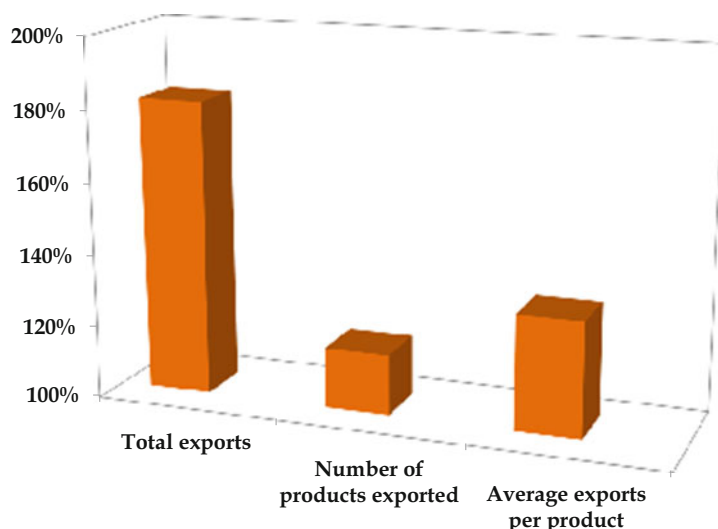


Fig. 4.2 Comparison between vertically linked affiliates and other exporters across various measures of export performance, Chile. *Source:* Authors' calculations

Indeed, we ran an additional exercise (not shown) in which we compared only company affiliates. We found that the affiliates of multinationals that are inserted in GVCs have superior capabilities than the affiliates of multinationals that are not inserted in GVCs. The reason could be that affiliates that provide inputs to their parents in other countries are exposed to higher standards than the affiliates that only serve the domestic market.

While the exercise that we present in this section focused only on one mode of offshoring—vertical FDI—other studies have found similar results: firms participating in international production networks (not only affiliates of multinationals but also local independent suppliers) tend to have superior capabilities and outcomes than other firms. For instance, a study of Italian firms shows that independent local suppliers that serve firms abroad also tend to have greater productivity levels than other firms in the country (Agostino, Giuntam, Nugent, Scalera, & Trivieri, 2011). An increasing number of studies also show that suppliers selling inputs to global firms located in their own countries have improved capabilities relative to other local firms (Gorodnichenko, Svejnar, & Terrell, 2010; Javorcik & Spatareanu, 2009). In one example of this latter set of studies, Iacovone, Smarzyska Javorcik, Keller, and Tybout (2011) described how Walmart provides local manufacturers of consumer goods with a larger market but at the same time puts pressure on these suppliers to improve their products' appeal. Their analysis showed that after Walmart entered Mexico, the high-quality upstream suppliers of merchandise and food expanded their sales and became more productive, whereas the low-quality suppliers experienced reductions in both sales and productivity.

The evidence in this section and the literature in general indicates that firms in developing countries seeking to join international production networks must improve skills and capacities—typically to levels above those of the average local firm—to meet the standards of global players.

In the next section we use case studies to dig deeper into the relationship between the capabilities of firms in Latin America and their ability to join international production networks. The case studies evaluate not only affiliates of multinationals but also independent suppliers. Examining the experience of these firms provides insights into what it takes to become part of an international production network and in what specific characteristics the firms that became engaged in a GVC differ from other firms. By establishing the empirical regularities that make these firms successful members of global supply chains, we can provide additional insights on policy issues that might help other firms achieve similar outcomes.

Empirical Regularities from Case Studies

In this section we summarize the results of ten case studies prepared for this report with the aim of increasing our understanding of the drivers of GVC participation. We use the case studies to highlight common characteristics among firms participating in international supply chains and discuss what these common characteristics tell us about challenges and obstacles involved in GVC participation.

Each case study analyzes a firm in Latin America that successfully joined an international production network by providing intermediate inputs or services to other firms abroad, either as a subsidiary of a MNC or independently through contractual agreements. The case studies encompass the following industries and countries: footwear and auto parts in Argentina, aeronautics and coffee in Brazil, food products in Colombia, software and electronics in Costa Rica, and IT services and aeronautics in Mexico.⁴ The methodology for the case studies was informed by an emerging literature on GVCs that emphasizes governance aspects of these chains, and thus the characteristics and power relations across the various participating units (see, for instance, Gereffi, 1999; Gereffi, Humphrey, & Sturgeon, 2005; Humphrey & Schmitz, 2000).

⁴The case studies were developed as part of the IDB research project International Fragmentation of Production and Insertion of Latin America and the Caribbean in Global Production Networks. The corresponding references are the following: González, Hallak, Schott, and Soria (2012); Cafaggi et al. (2012); Meléndez and Uribe (2012); Monge-Gonzalez and Zolezzi (2012); Brown-Grossman and Domínguez-Villalobos (2012).

It is natural to expect differences among the cases; after all, each study analyses the experience of a particular firm in a given country and industry. While each case has its own peculiarities and idiosyncrasies, we found surprising similarities in the characteristics of the firms participating in these networks. We group these similarities into five empirical regularities. We now describe each of these five empirical regularities and use examples from the case studies to illustrate them.⁵ Then, we comment on what these empirical regularities reveal in terms of challenges and policy implications.

Empirical Regularity 1: Prior Exposure to International Practices and/or Markets

The first empirical regularity that we observed in almost all the cases is prior international business experience. Typically, the manager, the CEO, or the owner of the firm had some exposure to international practices and/or markets even before the firm was established.⁶ Two examples illustrate this point. The first one is from Basso, an Argentine firm that manufactures combustion engines and has become a successful supplier to automakers around the world (see Box 1, Chap. 3). In the beginning, the company sold valves exclusively in the domestic market. It later entered the international markets, largely as the result of the international experience gained by the elder son of one of the company's owners as an electromechanical engineer at one of Basso's steel suppliers in France and then at Renault plants in France and Argentina. These experiences gave him critical technical knowledge not only about valves, engines, and materials, but also about the organization and business practices of global automakers. In particular, working for Renault gave him first-hand knowledge about the relationships global firms expect to have with their suppliers. Later, when he started work in Basso, he introduced changes in the production methods and the organization of the firm that became critical for the company's entry into several international supply chains.

⁵Note that this does not intend to create a taxonomy for value chain participation. After all, the evidence is based on only ten cases of firms that are all located in LAC. The purpose of this exercise is to highlight common characteristics that could reveal particular challenges that firms in the region are facing to join GVCs.

⁶This evidence is consistent with other studies that examine the relationship between prior international experience and exports in general. For example, Artopoulos, Friel, and Hallak (2013) describe case studies in which export pioneers had previous experience working and/or living in foreign markets. Molina and Muendler (2013) and Mion and Oromolla (2010) show that firms that hire workers and managers with previous experience in exporting firms are more likely to export.

The second example is Graúna, a Brazilian producer of parts and components for airplanes that has supplied global companies that include Pratt & Whitney, Boeing, Airbus, and Cessna. Graúna was established by ex-employees of Embraer, the Brazilian airplane maker, an experience that gave the new company's executives exposure to international practices and methods. Graúna gained additional expertise by selling inputs and components to Embraer. These associations with Embraer proved instrumental in helping Graúna to eventually join the supply chains of some of the foremost aircraft integrators in the world.⁷

Empirical Regularity 2: Targeting of Market Segments Based on Some Form of Comparative Advantage

The second empirical regularity among the case studies is that firms join international supply chains by targeting segments of the markets where they have a comparative advantage. In some cases, these comparative advantages have been resource based, such as the insertion of Brazilian coffee grower Daterra in the supply chain of Illy, the Italian coffee roaster. In other cases, the companies have exploited the relative spatial and cultural proximity with the US to enter segments of industries in which the relationship with the buyer required frequent face-to-face interactions.⁸ This was the case, for instance, for software companies in Costa Rica (Avionix) and Mexico (Softtek) in targeting tailor-made software to the US market, where their ability to provide rapid and flexible solutions gave them an advantage over giant companies in distant India and China (see Box 4, Chap. 3). Another example of purposely selecting specific market niches where comparative advantages can be exploited is Tosone, an Argentine footwear producer. In this case, the firm explicitly avoided engaging in direct price competition with lower-wage Asian countries by targeting high-quality design-intensive shoes not oriented to the mass market, and where volume and low factor costs were not vital for survival.

Empirical Regularity 3: Painstaking Accumulation of Capabilities and Use of Certifications as Evidence of Proficiency

Once firms target a specific segment of the market, they accumulate capabilities to the point where they receive at least some form of certification as evidence of proficiency. This was the situation in almost every case analyzed, from the resource-based Brazilian coffee grower Daterra, which obtained ISO 14001 certification for

⁷Benefits in these cases may include not only technical knowledge but networking as well.

⁸This is typically refer to as “relational linkages.”

expertise in production sustainability, to the highly technical Costa Rican aircraft software developer Avionyx, which obtained a DO-178B certification required by the US Federal Aviation Administration on software safety attributes. In some of the cases, the contract the firm signed with the buyer included support for certification as part of the agreement. In other cases, potential suppliers obtained certifications on their own to raise their profile and thus their potential for joining GVCs. Some firms regarded the certifications as business cards, which they used to introduce themselves to potential clients.

Empirical Regularity 4: Firms Leveraged Resources and Collaborated with Other Peers to Address Common Challenges

Evidence from the case studies indicates that firms seldom join an international production network on their own. Instead, they tend to leverage resources with other firms, particularly as a means for attaining certain capabilities. Sometimes they address information or coordination problems by engaging in various forms of collaboration, such as clusters or business associations. One example is Graúna, the Brazilian subcontractor in the aeronautic industry mentioned earlier. Graúna increased its production scale, financial structure, and technological capacity through a merger with two other companies and a venture capital group. This enabled Graúna to offer the technological and financial capabilities needed by the global aircraft firms. Another example comes from Tosone, the Argentine footwear supplier. In order to service a global buyer in Sweden, Tosone had to offshore part of its own production process to upstream suppliers in Brazil because its own capabilities were not sufficient to comply with the high standards required by the Swedish buyer.

Examples of less formal forms of cooperation provide equally useful insights. In one, auto parts producers in Rafaela, Argentina, formed a group for lobbying the government to improve trade facilitation issues. Another example is the business association of coffee growers in Brazil that collected fees to pay for the fixed costs of participating in international trade fairs.

Empirical Regularity 5: Continuing to Learn and Improving Capabilities Even After Joining a GVC

Another interesting aspect that we observed in many of the case studies is that firms do not stop accumulating capabilities after joining a global network. Indeed, in some cases this process intensified. One example is Hugo Restrepo, the Colombian firm profiled in Box 1, Chap. 1 that provides chili pepper paste to the American company McIlhenny. Even after the two companies signed a long-term agreement, Hugo Restrepo had to continuously acquire key technical knowledge on crop management and production. Indeed, over the course of 15 years after signing the first

contract, McIlhenny sent experienced agronomists to Colombia twice a year to check on the crops and to make sure that Hugo Restrepo was incorporating the latest technological innovations.

The second example is Daterra, the Brazilian coffee grower mentioned previously. Daterra began operations in the low-price, low-quality local commodity coffee market, but meticulously accumulated skills to enter the high-price, high-quality supply chain of Illy. Entering Illy's supply chain only marked the beginning of Daterra's road to improving its capabilities. Daterra continued to acquire technical knowledge through its relationship as a supplier of Illy. Indeed, after some years the two firms formed a joint venture in genetic research to develop new varieties of coffee. The exposure of Daterra to this global company allowed the firm to eventually sell to other specialty coffee buyers around the world. Today, Daterra sells less than 2 % of its high-quality coffee to Illy; in 2000 it sold virtually its entire production to that firm.

In this section we have presented five empirical regularities drawn from a group of ten case studies of LAC firms that participated in international supply chains. It is important to mention that these regularities should not be read as necessary conditions to join GVCs. Some firms successfully participated in production networks without having all of these regularities at the same time.

The evidence presented here will certainly not settle the discussion of what it takes to join an international production network successfully, since the analysis looks at only a small sampling of firms. Nevertheless, this evidence does highlight major issues that help determine a firm's successful participation in global supply chains, particularly firms in Latin America and the Caribbean. In the next section we return to each of these empirical regularities and discuss what they reveal in terms of challenges associated with GVC participation, and the lessons they hold for policy makers.

Policy Lessons from the Empirical Regularities

International exposure. The first empirical regularity regarding international exposure reveals a challenge that is all too common in accessing international production networks: information failures. Lack of information is the reason for many failed attempts to meet quality standards demanded by lead firms. This can be the case for domestic producers, for example, which may operate in local environments that tolerate quality defects and business practices that are unacceptable in developed countries. As such, these firms might not know what it takes to comply with the rigorous standards imposed by lead firms in international supply chains, or they might not understand the importance of adhering to those standards (González et al., 2012).

Information problems can be particularly acute in many international supply chains. Suppliers typically need to customize their production to the requirements of particular buyers, while buyers need to convey this information to the suppliers and make sure they are capable of delivering the product with the correct specifications. In other words, the information flows that are typically required for a match

between a buyer and a supplier in an international supply chain can be vast, and lack of information can easily keep potential suppliers on the sidelines while buyers rely only on a few known providers. Exposure to international practices and/or markets can certainly facilitate access to information, which may explain why evidence of prior international experience was so widespread in the successful cases summarized in the previous section. The challenge is to identify policy measures that can address the problem of lack of information.

Traditional government actions designed to deal with information problems in the area of international trade fall on the shoulders of export promotion organizations (EPOs). Therefore, an obvious area for public policy relates to efforts for strengthening export promotion. EPOs may offer training for inexperienced firms on export procedures, marketing, and business negotiations. EPOs may provide information on trade opportunities abroad as well as specialized counseling and technical assistance for taking advantage of these opportunities. They may also coordinate, support, and co-finance participation in international trade missions and trade shows, and arrange meetings with potential foreign buyers (Volpe Martincus, 2010). But these actions do not always materialize. Evidence from the case studies, for example, shows that EPOs do not always properly prepare firms before trade fairs; or, the business rounds they generate fail to properly match the capabilities of domestic firms with the requirements of foreign buyers. In general, the effectiveness of the EPO's actions to help firms become part of international supply chains is proportional to their efforts in gathering information regarding the structure, the modes, and the specific conditions of these supply chains.

Another policy option for reducing information gaps is to promote environments that facilitate exchanges of information between players in the industry or across industries. While it is natural that firms compete with each other, successful players often are willing to share their experiences with their peers. For instance, ProChile, the country's EPO, conducts a coaching program in which a group of potential exporters meets with a mentor to share its experience in the international markets. Such information exchanges can be helpful in various ways. Sometimes, potential exporters are not fully aware of the steps or procedures that might be required to attain and maintain quality standards, or they might not even be convinced that such efforts are worth the trouble. Exchanges with successful peers can be an effective way to internalize this information. Similarly, information exchanges can help spur quality upgrades that might serve many different firms, even different industries. For instance, if many firms can benefit from the same type of input modifications or the same quality of upgrades, policy efforts could promote information exchanges between the relevant players that could eventually lead to the desired upgrade (González et al., 2012).

Governments also can help organize exchanges where the information gap is filled by current or retired staff from international buyers. These experts can provide clinics on what buyers expect from their suppliers, in workshops organized by sectors. This was the approach taken by the Department of Trade and Industry in the Philippines through its Product Specialists Program. Another approach is to

send representatives of local firms abroad rather than bring specialists to them. This strategy has been used by the Indian Export-Import Bank through its Indian Export Marketing Fund (Egan & Mody, 1992).

Exploit market segments with comparative advantages. Regarding this second empirical regularity, one could argue that firms naturally target market segments where they can survive. But we do not know whether this is always the case, in large part because we lack information about firms that have failed in their attempts to join GVCs. What is revealing from the successful cases that we observe is that they all consist of firms seeking to exploit some clear forms of comparative advantage. The policy discussion here is whether the government should encourage firms to target some sectors or market segments and not others; in other words, whether public support should engage in “targeting.”

The issue of targeting as a public policy can be controversial because the government appears to be “picking winners.” Moreover, the discussion as to whether public agencies should engage in targeting does not pertain solely to the GVC arena, and thus the issue is not going to be settled here. What the case studies show, however, is that effective policy efforts like the one mentioned above in export promotion require gathering vast amounts of information on different aspects of the GVCs. Gathering this amount of information is not practical without some form of prioritization. Not surprising, therefore, various studies indicate that targeting in both export promotion and investment attraction is more effective than not targeting (for a summary, see Blyde, Pietrobelli, & Volpe, 2014). The guidance that the case studies from this report could provide is that if targeting is going to be part of public policy, it should be aligned to the country’s comparative advantages.

Certifications, visibility, and credibility. Support for our third empirical regularity regarding firms meeting international standards as a condition for accessing GVCs can be found in other studies (see Morrison, Pietrobelli, & Rabellotti, 2008). The importance of standards and certifications obviously varies by type of industry and even by products. In general, however, compliance with standards has become an important condition when global firms screen potential suppliers (Humphrey & Schmitz, 2008; Nadvi, 2004; Quadros, 2004). The public sector could help to establish standards or facilitate their implementation by the private sector.

Note that implementing standards and certifications could entail additional production and trade costs to the suppliers, as compliance might require adapting products and/or practices, building administrative systems, auditing, and testing or investing in new technologies. Indeed, some early cross-country evidence suggested a negative relationship between standards and entry into export markets (e.g., Chen, Otsuki, & Wilson, 2006). However, more recent individual country analyses with more disaggregated data indicate that standards are associated with increased exports (Volpe Martincus, Castresana, & Castagnino, 2010). Moreover, the new evidence generally shows that benefits in terms of increased exports tend to outweigh compliance costs (see, for example, Mangelsdorf, Portugal-Perez, & Wilson, 2012; Masakure, Henson, & Cranfield, 2009; Otsuki, 2011).

Compliance might not necessarily be mandatory when implementing quality standards and certifications. A group of firms interested in signaling their ability to deliver higher-quality goods could develop and attain quality labels to increase visibility and overcome information barriers. The public sector could also develop expertise in creating and managing such labels and fostering their implementation by the private sector (González, et al., 2012). Local certifications, however, could have minor or no effects if the global buyers do not know them or are skeptical of their value. Therefore, in developing and implementing standards, links could be formed with standards and certification institutions in developed countries, since these confer greater credibility (Egan & Mody, 1992).

Besides certifications, buyers sometimes look at the credit rating of potential suppliers to determine whether their businesses are sustainable. Often, however, credit ratings are not available. Governments in the region could promote the provision of credit rating services, perhaps with the assistance of international agencies.

A final area related to credibility concerns the reputation of the country. The buyer may assume that the technological capabilities of the supplier or its overall skills reflect the country's development or economic level. Buyers can hold initial negative expectations of a potential supplier if the country's reputation is not good. One way governments can improve their countries' image is by identifying exemplary plants and inviting international buyers to tour them (Egan & Mody, 1992).

Cooperation. The fourth empirical regularity is the cooperative activities firms carry out among themselves to raise capabilities, address common barriers, pay for the fixed costs of certain activities like assisting for an international trade fair, etc. Government support for such cooperation could be particularly important to solve coordination problems. For instance, an assembly plant might not be able to start operations because there are no local suppliers of a particular component; conversely, a potential supplier of that component might not initiate production because there is no local downstream demand for its product and the component may be costly to export (Trindade, 2005). Another example of a coordination problem is that a supplier might not invest in improving its production process without a buyer's commitment to establish a long-term relationship; but the buyer might not support such improvements unless the supplier assures the buyer will have exclusive benefits.

Therefore, cooperation among firms may not materialize for a variety of reasons, and public policy may be useful in making it happen. Some examples follow below. One area relates to mergers and acquisitions (M&As). Acquiring a wide range of skills might be particularly important for firms in certain industries such as aeronautics, which tend to give preference to suppliers that can deliver complete products rather than sub-components.⁹ A small firm might not have all the skills to produce a complete product on its own, but it might be able to do so by acquiring another firm and its capabilities. M&As can also be important given recent trends in consolidation, in which buyers are using only the most capable and largest suppliers

⁹There is also more general evidence indicating that in some industries, such as electronics (Sturgeon & Kawakami, 2010) and automobiles (Van Biesebroeck & Sturgeon, 2010), lead firms appear to prefer larger, more capable first-tier suppliers that operate globally.

and eliminating the others (Gereffi & Frederick, 2010; Milberg & Winkler, 2010; Sturgeon & Kawakami, 2010).

The typical problem facing small firms contemplating a merger or acquisition is the lack of sufficient investment capital to carry out the operation, despite the likelihood of large future benefits. Public policies could be designed to fill this intertemporal gap, as shown by the example mentioned above of the Brazilian firm Graúna, which merged with two other companies and a venture capital group. Graúna benefited from a program run by the Brazilian development bank BNDES, which provides temporary capital for small and medium-sized firms.¹⁰ The program has two notable features: first, BNDES always acquires less than 50 % of the shares of the company to avoid taking control of the firm; and second, BNDES exits from the company capital after 4 years, a period that is deemed adequate for the firm to succeed in its business and to buy the shares back from BNDES.

Other countries elsewhere in the world also offer programs to support M&A. One example is the Economic Development Board (EDB), an autonomous government agency in Singapore that offers a mergers and acquisitions scheme that consists on an allowance of 5 % of the value of the acquisition, a tax deduction for the transaction costs, and stamp duty relief on the transfer of shares.

These examples of government designed programs aim at encouraging companies to grow their business and shorten the time needed to acquire capabilities through M&As. Clearly, there is not a one-size-fits-all program; each design might depend on a number of factors, including the country's anti-trust laws. One should also not expect that M&As can be the panacea at all times. The business world is full of examples of M&As that have failed to live up to expectations, although there is also an increasing body of literature offering advice on how to minimize the chances of M&As going sour (e.g., Papadakis, 2007). In general, however, the empirical research supports the positive effects of M&As. It has been shown, for instance, that after M&As, many firms have been able to use synergies from asset complementarities to introduce new products, improve cash flows and/or increase exports (Beena, 2006; Hoberg & Phillips, 2010; Pulak & Neha, 2012).¹¹

Public action can also help to strengthen business associations or create new ones in sectors where they are lacking. Empirical analyses, including some of the evidence reviewed in the previous section, show that industry associations often have helped to address information problems by collecting fees to pay for participation in international trade fairs, producing international publicity, developing joint marketing strategies, creating certification schemes, or forming a united front in the negotiation of raw materials, among others. Wagner (2012), for example, shows that firms that engage in international trade rely more than other firms on business associations, even after controlling for country and industrial sector and after conditioning on productivity.

¹⁰ In particular, the Program for the Capitalization of Technological-Based Companies (CONTEC).

¹¹ Note that other programs that subsidize SMEs might delay this process of consolidation; therefore, efforts should be made to ensure that if M&A programs are pursued, they are not hampered by potentially incompatible initiatives.

In some cases, however, business associations are weak or are designed for rent seeking rather than constructive work. Therefore, governments could support sectors that wish to improve their organization (Altemburg & Meyer-Stamer, 1999). For example, the Brazilian Specialty Coffee Association (BSCA) received support from the Brazilian Trade and Investment Promotion Agency that enabled it to carry out several important initiatives. These included helping its associated firms participate in international fairs and establish classifications and certifications. These initiatives enabled many coffee growers to overcome the asymmetric information problems that were restricting their participation in the supply chains of international roasters (see Box 1).

Governments can also implement programs to encourage collective action among private firms, such as Chile's Associated Development Programs (Programas Asociativos de Fomento, PROFO), run by CORFO, the country's economic development agency. In this program, resources are transferred to a group of firms instead of to an individual company, in a competitive process in which the firms design and present a common project. Anecdotal evidence indicates that the program helped the

Box 1: Strengthening Business Associations

Brazilian coffee growers and the Illy supply chain. For decades the worldwide coffee business was structured almost exclusively around the commodity model prevailing when coffee was regulated with a target price in the international market and an allocation of export quotas among producing countries. The collapse of the system in 1984 generated economic incentives for the development of a market in which coffee could be differentiated by quality or processes (e.g., organic).

The Italian firm Illy, a medium-sized roaster, went to Brazil, attracted by the high quality of the country's coffee cherries. It quickly discovered that problems in processing the cherries into quality coffee were mainly due to the lack of incentives for producers to invest in high-quality production methods. Illy created an award for the best coffee beans and established a price differential to reward quality. But the company did not teach prospective producers the precise characteristics of superior coffee and how to identify these characteristics. Some of this knowledge is tacit, and its acquisition requires a great deal of practice and learning.

The information the growers needed was ultimately provided by an intermediary: the Brazilian Specialty Coffee Association (BSCA), which received the support of the Brazilian Trade and Investment Promotion Agency. BSCA developed a special classification system, a certification scheme, and a technical training program that enabled many growers to learn how to identify the characteristics of a high-quality coffee. This eventually enabled some of the growers to reach Illy's standards and join its supply chain.

Source: Based on material from Cafaggi et al. (2012).

country's wine industry by supporting the efforts of private firms to build common wineries or create wine-related business associations (Dini, 2009). More formal evaluations also found positive effects among participating firms (Benavente & Crespi, 2003; Maffioli, 2005). Although the program has not focused specifically on the participation of firms in global supply chains, its core aim of reducing the transaction costs in inter-firm collaboration certainly supports this objective.

Firms that lack the full range of the capabilities needed to meet international standards have also experimented with consortium schemes, in which different companies share their skills in an arrangement that is relatively formalized under a legal framework; these schemes sometimes have received government support. The design of the consortium is a fundamental issue in these initiatives. Box 3, Chap. 3, for example, shows that consortia can run into problems if they are not well designed—for instance if the buyer does not know with certainty which consortium member is ultimately responsible for the production process.

On some occasions purely inter-firm collaboration would not be enough. Cooperation between the public and private sector might be required, particularly for providing a specific public good. This was the case in the creation of a customs office in the Argentine city of Rafaela. As seen in Box 1, Chap. 3, this facility, which resulted from the coordinated lobbying efforts of private firms and city officials, was instrumental in creating an improved logistics environment that greatly facilitated the participation of auto parts firms in international supply chains (see Box 1, Chap. 3).¹²

A final policy area associated with promoting complementarities among firms relates to a country's levels of trade protection. An example is the Argentine supplier that offshored part of its own production process to upstream suppliers in Brazil, a practice that firms often use to complement their own capabilities with those of their peers in other countries. Accordingly, governments in the region should be aware of the potentially injurious effect of tariff barriers, import quotas, or non-automatic renewal of import licenses, in limiting the access of local suppliers to high-quality inputs from abroad.

Ongoing learning. The evidence from the case studies indicates that ongoing learning is a widespread practice. Indeed, in some cases, the improvement of capabilities was assisted by the buyer or the lead firm after accession to the GVC.

The buyer may promote learning by supplier firms through different means, such as sending international experts to train local workers (as in the case of Hugo Restrepo and McIlhenny), conducting training in the buyer's plant, or even providing online lessons (Egan & Mody, 1992). This is consistent with a literature on GVCs showing that suppliers in production networks receive training and knowledge from lead firms. This, however, does not suggest that an initial contact between a local supplier and a global buyer is sufficient to develop these capabilities. As the previous empirical regularities indicate, a great deal of preparation from the supplier on its own might be required to gain initial access to an international production network.

¹²For a more general discussion on public policies for promoting more collective actions among private firms and between the public and private sector, see Pietrobelli, Casaburi, and Maffioli (2014).

Additionally, the transmission of knowledge from lead firms to suppliers does not necessarily occur automatically, as it might depend on a host of different factors (see Pietrobelli & Rabellotti, 2011). For instance, lead firms may transfer some knowledge to their suppliers because failing to do so might entail risks for themselves (Humphrey & Schmitz, 2002; Schmitz, 2006; Schmitz & Knorringer, 2000).¹³ However, the literature on GVCs stresses that while global firms are likely to support suppliers to improve the production process for the inputs that they are buying, or to improve the quality of those inputs, they do not tend to support actions that would enable the suppliers to carry out activities that are close to the global firm's core competencies, and thus potentially bypass them in the supply chain, or even enter the market as competitors (Egan & Mody, 1992; Humphrey & Schmitz, 2002; Kaplinsky, 2005).¹⁴

Nevertheless, the overall issue that emerges from this empirical regularity of long-term learning is that the ability to succeed as a member of an international supply chain might depend on the supplier engaging in a continuous process of adaptation to the changing conditions of a supply chain. This point is reinforced by two trends in GVC practices: the constant assessment of alternative sourcing points and the process of consolidation.

For example, a recent survey conducted by the University of Michigan and the Supply Chain Management Review at 164 companies from around the world indicates that lead firms increasingly reassess possibilities for optimizing their supply chains.¹⁵ Sixty-five percent of these companies indicated that they constantly rethink existing sourcing points by evaluating current and potential suppliers. They do so partly in response to changing economic conditions in the sourcing countries, such as variations in salaries, fluctuations in exchange rates, or modifications in taxes and regulations, which force lead firms to re-optimize their sourcing strategies. Another reason is changing trends in global supply chain strategies and the constant introduction of new practices. The introduction of new practices often means that suppliers constantly must adapt and develop new capabilities and strengths. Box 2 presents concrete examples of new supply chain practices increasingly implemented by lead firms around the world that demand superior capabilities from suppliers. All this means that writing an initial contract with a lead firm does not necessarily guarantee a long-term relationship in an international production network. Suppliers must constantly adapt to new supply chain requirements or risk being replaced by other suppliers.¹⁶

¹³For example, the arrival of a component with the incorrect specifications can shut down entire production lines until all the correct inputs have been assembled, thus delaying production of the final product.

¹⁴In the GVC jargon, this has been referred to as the willingness of the lead firms to support their suppliers in actions leading to "process" and "product" upgrading, but much less to "functional" upgrading (Humphrey & Schmitz, 2000, 2002).

¹⁵Eighth Annual Global Survey of Supply Chain Progress.

¹⁶Note that constant adaptation to new market conditions is also important for firms engaged in final goods trade.

Box 2: Adapting to Changing Supply Chain Strategies

The increasing importance of supply chains for many firms has given rise to a supply chain management field that aims to optimize supply chain structures through the efficient integration of suppliers, factories, warehouses, and stores to ensure that the merchandise is produced and distributed in the right quantities, to the right locations, and at the right time, while minimizing total system costs.

The supply chain management field is constantly evolving, and new strategies are introduced and applied by many corporations. Lead firms use many of the strategies to manage uncertainty or to cope with supply chain disruptions. Very often these strategies require that suppliers develop greater capabilities to adapt to more demanding environments. In Chap. 3, for example, we saw how just-in-time delivery services put great demands on suppliers and on the logistics systems of their countries. Below are three additional examples of supply chain strategies increasingly implemented by lead firms that require top performance from their suppliers.

Postponement. Lead firms occasionally must delay the final customization of a semi-finished good until the exact customer specifications are fully known; this strategy is known as postponement. Consider, for example, a company A that sells T-shirts in its own stores but outsources the manufacturing process to suppliers in other countries. Under a traditional arrangement, the T-shirts are produced by the suppliers according to predetermined demand forecasts. Once they are completed they are shipped to company A's stores. Suppose that due to the forecast analysis, all the T-shirts are dyed green. If demand suddenly changes to red, company A's stores are now stuck with a product that nobody wants and that can't be changed. Under a postponement arrangement, however, suppliers keep stocks of undyed T-shirts in their facilities until company A tells them which color they should be dyed. Postponement, therefore, reduces the chances of unwanted merchandise due to changing market demands. Note, however, that this arrangement requires more capabilities on the part of the supplier. For one thing, the burden of inventory holdings is shifted to the suppliers, which must warehouse an inventory of undyed T-shirts. In addition, they need a more agile production system, capable of stopping at a semi-finished stage and resuming quickly once the final specification is known.

Supply chain risk mitigation. The 2011 earthquake and tsunami in Japan clearly demonstrated how natural disasters can disrupt global supply chains. Many Toyota, Honda, and Nissan suppliers had to shut down plants, which significantly reduced production. Honda and Nissan, for instance, saw their domestic production fall by more than half. While the natural disaster in Japan was clearly a rare event, many other kinds of incidents frequently occur that can bring supply chains to a halt. Examples are machine breakdowns, contamination, strikes, and political instability. Accordingly, lead firms increasingly engage in strategies to mitigate potential supply chain disruptions.

(continued)

Box 2: (continued)

One such strategy is to build resilience across the supply chain by creating redundancy. For instance, lead firms employ redundant suppliers that are geographically diversified, so if a disaster hits a supplier in one location, the same input can be sourced from a supplier in another location. Clearly, increasing redundancy represents a pure cost increase for the lead firm, but these costs tend to be considered an insurance premium. The redundancy strategy may also take the form of requiring a supplier to increase reserves or to develop plans for disruptions in internal operations. In these cases, the supplier must hold excess inventory or design contingency plans. In this way, supply chain risk mitigation strategies tend to demand higher capabilities from all the members of the chain, including the suppliers.

Cash-to-cash cycle. The time required to convert raw materials or inventory purchases into sales revenue is called the cash-to-cash cycle. This is generally related to inventory turn: the higher the inventory turn, the quicker the cash conversion. For instance, if a lead firm has to pay its suppliers immediately after receiving intermediate inputs, and then holds inventory for days before its own sales are completed, the firm will not be able to use this cash for other purposes during this period. At the other extreme, if the firm sells the final product before paying its suppliers, in effect it enjoys free inventory and may even earn interest by investing cash while awaiting the payment date. Supply chain management strategies related to inventory turn are typically geared towards reducing the period between the date of investing in inventory purchases and the date of collecting cash from the customers.

One way lead firms can reduce the cash-to-cash cycle is simply by delaying payment to their suppliers until cash from their own sales is collected; this is illustrated in Fig. 4.3, with the example of five companies. The blue bars measure the average number of days it takes for each of these companies to pay its suppliers, while the red bars indicate the average number of days the companies hold inventory before completing their own sales. In all the cases, the blue bars are higher than the red bars, meaning that the suppliers are financing the lead firms when they hold inventory. Once again, this practice requires capable suppliers with working capital sufficient to carry them through long periods of time before collecting cash from selling their intermediate goods.

The three practices shown in this box illustrate how suppliers are addressing increasing challenges through the use of agile and adaptable production processes as well as adequate financial capabilities.

(continued)

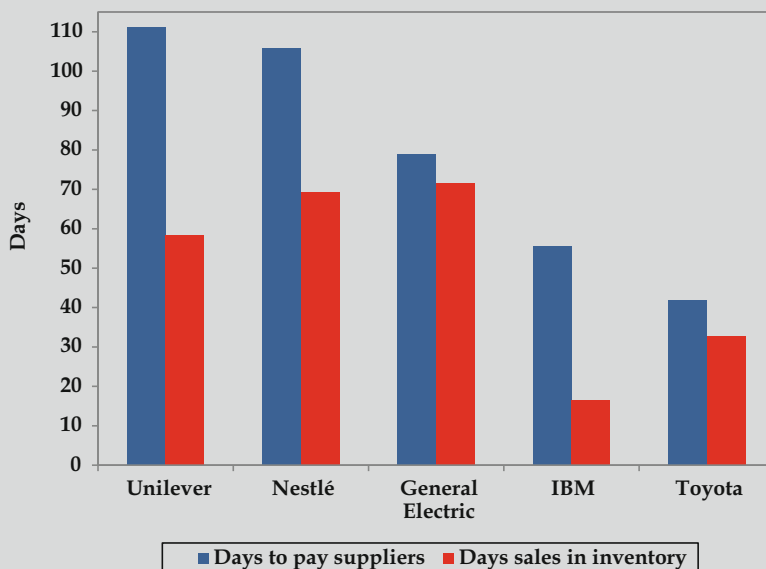
Box 2: (continued)

Fig. 4.3 Key indicators of cash-to-cash cycle in selected firms (2012). *Source:* Authors' calculations based on the companies' annual reports, 2012

A second trend, which has been ongoing for more than a decade and which was exacerbated after the global financial crisis of 2008, is the consolidation of GVCs. While buyers are always looking for information about good suppliers in case a need arises, these same buyers are increasingly reducing the number of their suppliers and forging closer arrangements with the most capable performers. By working more closely with fewer suppliers, buyers can visit the suppliers' plants more frequently, make direct assessments of problems, and help to reduce various business uncertainties, all of which ultimately lower overall costs (Egan & Mody, 1992). While consolidation can be a threat to current suppliers, it can also be seen as an incentive to continue to improve performance and join a selected group of suppliers.¹⁷

The most important message to take away from this last empirical regularity is that supplier firms cannot regard the job of improving capabilities as a one-time effort. They must continue to learn and upgrade their capabilities even after they initially break into the network. This might have implications for public policy too, although at

¹⁷For potential suppliers, however, consolidation may imply that the window of opportunity to break into a network might be smaller today than in the past.

a broader scale. For instance, providing public support in the form of a sector-specific public good or to solve a coordination failure does not mean that the same sector might not require another specific public good down the road, or might not face a new coordination problem in the future. This kind of support should be continuous.

Local Linkages

Participating in international production networks is not limited to firms that export intermediate goods or services to companies in other countries. Firms in developing countries might also take advantage of the increasing fragmentation of production by becoming upstream suppliers to international companies (e.g., multinationals) located in their home countries, and which themselves are inserted in GVCs. While this could be the most reasonable strategy for many small and medium firms in developing countries, it does not constitute a way of sidestepping issues discussed earlier regarding firms' skills, capabilities, and product quality. As illustrated by the example of the Brazilian coffee growers inserted in Illy's supply chain (see Box 1), issues regarding firms' capabilities remain important even if the supplier does not export directly. Nevertheless, it is reasonable to expect that the challenges of joining an international production network are reduced when the hassles of exporting directly are taken out of the equation. This is particularly the case for small and medium firms.

Fostering linkages between local upstream suppliers and international firms located in the same country can be important even for countries deeply engaged in international production networks, such as Mexico. For instance, even though thousands of firms in Mexico directly export through supply chains to the US, there is a general perception that the insertion has been mostly in assembly operations, and that additional Mexican value should be incorporated in the international production networks in which the country participates. Box 3 presents statistical evidence supporting this perception.

Countries in various parts of the world have been pursuing programs to foster backward linkages between global firms located in their territories and local suppliers. In this section we take a look at some of these programs, which are generally designed to address information and coordination failures.¹⁸ Experiences from different countries illustrate how these issues were addressed.

¹⁸ Multinationals might not have sufficient information about the existence of potential suppliers and/or their capabilities, which may result in selection bias and reliance on previously known suppliers. On the other hand, potential suppliers might not have the information needed to improve their capabilities or to access the resources needed to contact potential multinationals. Coordination problems might also inhibit backward linkages: multinationals might not transfer knowledge to potential suppliers, for fear that they might go off to serve other firms and take the knowledge with them. For their part, potential suppliers might not engage in costly relationship-specific investments, for fear the relationship will be short-lived.

The Costa Rican program Linkages for Exports (*Encadenamientos para la Exportación*)¹⁹ was created in 2001 to increase the domestic value added from high-tech multinational companies and help SMEs become local suppliers of these companies and subsequently direct exporters by expanding their technological capacity. The program, which is administered by PROCOMER, the country's national trade promotion organization, is a business matchmaking service based on the multinational firms' demands. In the program, the needs of these companies for inputs and raw materials are identified and then matched with local suppliers that can meet the required production, technical, and quality specifications and product characteristics. The program also seeks to create business opportunities through small projects jointly carried out by local SME suppliers and multinational firms to help the former become global suppliers. By reducing the potentially high costs of identifying local suppliers, the program primarily addresses a market failure related to information problems (see Monge-González, Rivera, & Rosales-Tijerino, 2010). Linkages for Exports has mainly focused on SMEs with more capabilities, fewer technical assistance needs, and thus a higher likelihood of becoming successful providers of multinational companies (see Monge-González & Rodríguez-Álvarez, 2013).

Over the period 2001–2012, Linkages for Exports created 1,355 linkages between more than 400 local companies (up from 23 in 2003) and 301 exporters, primarily multinational firms. During the same period, the annual number of backward linkages sponsored by the program increased from fewer than 10 to almost 250, and sales jumped from US\$800,000 to US\$12 million. The number of products sold by domestic companies averaged 1.5 in most recent years compared with one in the first half of the 2000s. Figure 4.4 shows the year-to-year evolution of some of these variables, which suggests that the program has been an effective matchmaking mechanism. Interviews with both SMEs and multinational companies confirm this positive view regarding the program's matchmaking function (see Monge-González et al., 2010; Vargas Madrigal, Céspedes, Gonzalez et al., 2010).

In a recent econometric evaluation, the program was shown to have had a positive impact on the real wages, employment, and export status of participating firms. Furthermore, firms continue to receive benefits from the knowledge acquired through their commercial relationships with multinational corporations, beyond the year they join the program. The evidence also shows that firms receiving more services from the program have received the greater benefits, which supports the idea that the level of support is important (see Monge-González & Rodríguez-Álvarez, 2013).

Despite these positive effects, Linkages for Exports appears to have a limited scope. For instance, the purchases associated with participation in the program accounted (on average) for a very small share of the total local purchases by multinational companies in Costa Rica over the period 2001–2011; in 2007 it was less than 1 %. Further, less than 20 % of the linkages under the program were actually incorporated into the multinational companies' high-technology final products, suggesting that most of the linkages involve inputs of low technological content

¹⁹Formerly known as “Costa Rica Provee.”

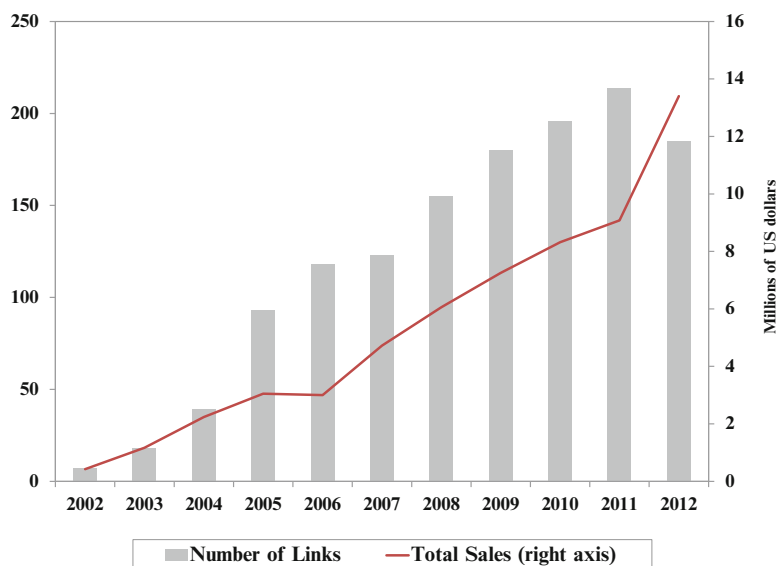


Fig. 4.4 Linkages for exports. Number of links and sales, 2002–2012. *Source:* Authors' calculation based on data from PROCOMER and Encadenamientos para la Exportación

(see Monge-González et al., 2010; Vargas Madrigal et al., 2010). More generally, there is a perception that even though the program is a valuable first step, it is far from making a substantial contribution; linkages between multinational and domestic firms are still weak, and spillovers associated with backward linkages are still limited (see, e.g., Monge-González et al., 2010; OECD, 2012; Paus & Gallagher, 2008).

Three potential factors might explain the program's relatively limited contribution. First, the resources devoted to the program seem modest. For instance, the unit running the program has only seven employees (one director and six staff tasked with business matchmaking) and an annual budget of US\$300,000 over the last 5 years. Even though the recent evaluation indicates positive results, these resources seem too small to significantly change the country's linkage capability. The second factor could be that Linkages for Exports has mostly concentrated on correcting the market failure associated with information obstacles through the matchmaking process. But in many cases, addressing this initial information problem might not be enough. Lack of technical know-how, absorptive capacity, certifications, human resource training, and difficulties in accessing financing have been identified as other obstacles in Costa Rica to expanding sales to multinationals (see Beltrán & Gutiérrez, 2007; Monge-González et al., 2010; Paus & Gallagher, 2008). Finally, it has been argued that Linkages for Exports could be better connected to other public programs dealing with other market failures (see Monge-González & Rodríguez-Álvarez, 2013). The government of Costa Rica has taken a series of steps towards correcting this situation. First, the directorate in charge of Linkages for Exports has begun to provide assistance to develop suppliers. Second, a Commission of Linkages for

Exports was established in 2010 to improve coordination of programs administered by member public and private organizations (see Dobles Madrigal, 2012a, 2012b).²⁰

We now review other international experiences with local linkage programs that have gone beyond the simple matchmaking process.

Countries around the world, and particularly those that have attracted large amounts of FDI, have implemented programs targeted at supporting local firms in their efforts to become suppliers of MNCs and participate in GVCs. A well-known example is Ireland's National Linkage Program (NLP), which was established in 1985 and managed initially by the country's Industrial Development Agency. Prior to the program, the government's efforts to encourage backward linkages were focused on a database and a liaison service to match MNCs with potential domestic suppliers. However, a government study found that these efforts had been weak and failed to close the technical and managerial gap between MNCs and local suppliers (Battat, Frank, & Shen, 1996). Therefore, the NLP was designed to go beyond helping MNCs find potential suppliers within Ireland to also help build the capacity and capability of these local suppliers. The program initially assessed the ability of companies to improve their technical, financial, and managerial capabilities, and then provided assistance to selected suppliers on specific development areas, including operational management and control, quality systems, finance, and marketing. The NLP is considered to have been a successful initiative. Fewer than 10 years after its creation, more than 200 MNCs and 80 suppliers had participated in the program, and more than 80 % of the suppliers had received ISO 9000 certifications (Battat et al., 1996). Eventually, the NLP program evolved from an initiative that exclusively supported linking local firms with MNCs in Ireland to a broader program helping incorporate Irish companies into GVCs.

Another example of a linkage program was Singapore's Local Industry Upgrading Program (LIUP), which began in 1986 and was administered by the country's Economic Development Board. The distinctive feature of this program was that multinational companies trained the local firms in return for government incentives. As such, the LIUP went beyond matchmaking to foster partnerships between specific multinational companies and potential suppliers. The multinational companies were encouraged to choose local subcontractors and help them improve efficiency. An employee from the multinational company was seconded to the local supplier, and the program paid the employee's salary. Local suppliers were selected on the basis of merit in an assessment that evaluated the strength of their core competencies and their capacity and critical mass to grow. By the mid-1990s the LIUP had already reported positive results. According to studies carried out by the LIUP and reported in Battat et al. (1996), the productivity of the suppliers in the early years of the program increased by 17 % and the value added per worker rose by 13.7 %.

²⁰These member organizations are the Ministry of Foreign Trade; the Ministry of Economy, Industry, and Commerce; the Ministry of Science and Technology; the Coalition of Development Initiatives; the Chamber of Industries of Costa Rica; the Chamber of Exporters of Costa Rica; the Association of Free Trade Zone Companies; the National Council for Scientific and Technological Research; and the Foreign Trade Promoter.

In 1994 the program included 32 buyer companies and 180 SME suppliers (Battat et al., 1996). The program continued to expand over the decade, and by 1999 the number of suppliers benefiting from the program had risen to 670. Eventually, LIUP was subsumed in a more general partnership program, and in 2012 received a budget of US\$250 million over 5 years.

The experience of Malaysia is particularly interesting because it provides elements of success as well as failure. An early initiative created in 1988 with the Vendor Development Program was aimed at assisting local SMEs to become suppliers of MNCs and other large companies in the country. For the most part, the program was restricted to SMEs owned by indigenous people.²¹ As a result of selecting SMEs on the basis of non-economic criteria, many suppliers failed to meet the needs of the MNCs (UNCTAD, 2011). For example, in 1996 54 anchor companies had signed up with the program, but only 27 had commercial relations with vendors (Karikomi, 1998). The largest anchor company, the national car maker Proton, had 17 vendors under the program, but they represented only 12 % of the company's vendors (Snyderhoud, 1999). The main concern was the low quality of the products the vendors provided (UNCTAD, 2011).

In the mid-1990s, the Industrial Linkages Programme (ILP) was launched. Unlike its predecessor, the new program provided for more merit-based selection criteria, a more active role of the MNCs in the selection of suppliers, and more assistance for the supplier to access finance and build capability. The program, administered by the Small and Medium Enterprise Corporation Malaysia, supports a range of supplier activities, including engaging in strategic alliances with multinational firms, training their employees, developing new products, and auditing factories to ensure the quality of their products. The program's main policy tool is a series of tax relief measures for both the suppliers and the multinationals. For example, suppliers are allowed to deduct expenditures from their income tax that they incurred in ILP activities, such as employee training, product development and testing, and factory auditing. If the company receives pioneer status, it is given a 100 % exemption for 5 years on income and a tax investment allowance of 60 % on qualifying capital expenditures incurred within the same period. Pioneer status can be achieved if the firm manufactures products contained in the List of Promoted Activities and Products and supplies its products to MNCs or large companies (UNCTAD, 2011). For its part, the participating MNC is allowed to deduct expenses incurred in supporting the supplier. The program seems to have fared better than its predecessor. By 2007, for example, 906 SMEs were registered under the ILP, and 128 of them were linked to MNCs and other large companies (UNCTAD, 2011).

In the Latin American region, Mexico has long supported the creation of business linkages between MNCs and local suppliers. In the 1970s, for example, the Mexican government created an information exchange system called the Sub-contracting Exchanges (Bolsas de Subcontratación), in which a database of businesses was made

²¹ The Bumiputera is the term used to describe the Malay race and other indigenous people of Southeast Asia. In 1970, the Malaysian government started implementing policies in different areas to favor this ethnic group.

available to multinational companies seeking local suppliers. Another initiative was the Productive Linkage Centers (Centros de Articulación Productiva), which helped foreign firms identify and select potential suppliers, mainly through buyer–supplier matchmaking services. However, matchmaking mechanisms proved to be of limited effectiveness in fostering successful linkages compared to other initiatives with a more comprehensive range of services (see UNCTAD, 2010). Therefore, Mexico has also tried out other initiatives beyond simple matchmaking, an interesting example being a set of initiatives in the Guadalajara electronics cluster. Mexico has attracted substantial foreign direct investment in the electronics sector since the early 1990s, particularly in the State of Jalisco and the city of Guadalajara. The cluster has been supported by a set of policies to promote the emergence of favorable spillovers from these foreign direct investments and the upgrading of local firms into more sophisticated segments and niches of the electronics value chain (see Dussel, 2010; Dussel, Palacios, & Woo, 2003; ECLAC, 2008; Padilla-Pérez, 2005, 2008; Padilla-Pérez, Cordero, Hernández, & Romero, 2008; Palacios, 2008).

In Chile, a supplier development program was launched in 1998 by the country's development agency, CORFO. The program was not specifically directed at fostering participation in global supply chains, since buyers did not have to be multinationals or exporters. Nevertheless, the initiative was designed in the same spirit as other linkage programs that are related to GVCs. For example, it resembles the LIUP in Singapore in creating linkages between anchor firms and suppliers. In the case of both programs, an anchor firm presents a proposal to help improve the capability of a group of suppliers, and an initial diagnosis carried out by an independent consultant determines the needs for upgrading. The anchor firm then carries out the action plan. The program finances up to 50 % of the costs of the upgrading process, and the anchor firm covers the rest. A recent impact evaluation found that the suppliers that participated in the program increased their sales, employment, and salaries relative to a control group (Arráiz, Henríquez, & Stucchi, 2012).²²

It is difficult to determine the effectiveness of these programs due to a lack of rigorous impact evaluations in many cases. Nevertheless, their experiences and evolution provide general lessons regarding program design. First, programs based exclusively on matchmaking services seem to have had more limited effects in fostering linkages between lead firms and local suppliers than programs that also provide complementary support to the suppliers. It is difficult to generalize about the type of complementary support required, since each industry and country has different needs. Nevertheless, judging from the experiences examined here, programs based on bundling matchmaking services together with some form of employee training seems to have been generally effective.

A corollary of the first lesson is the need for a proper articulation of linkage programs with other initiatives. For example, many countries have SME development policies, which may include training schemes. Coordination with such initiatives might result in more effective programs to foster linkages.

²² Pietrobelli and Staritz (2013) offer an insightful typology of interventions in GVCs.

Second, most successful linkage programs are based on merit-based selection criteria. Selecting the supplier using non-economic criteria may not only waste valuable resources but also jeopardize the sustainability of the program and discourage further FDI flows into the country. To ensure that the linkages are mutually beneficial, merit-based selection can be based on criteria designed by the government and also by the MNCs, as in the Malaysian ILP program. This calls for the involvement of MNCs from early on in the process.

Third, the assistance should be based on an objective diagnosis and auditing of the supplier so that its specific shortcomings can be identified and areas needing improvement can be addressed. The specific assistance might vary depending on the design of the program. Examples include soft loans provided directly to the suppliers, co-financing, tax relief to the suppliers and/or the MNCs, or contributions to the salary of an MNC's employee seconded to the supplier, as in the Singapore LIUP program. Finally, before committing large amounts of resources for a full-fledged program, a pilot program may be undertaken to fine-tune objectives, strategies, targets, and action plans. After the program is initiated, periodical reviews should be conducted to provide feedback for future policy design (see Axèle & Delane, 2008; IFC, 2008; Potter, 2001; UNCTAD, 2010). In addition, the program should reach a minimum scale to ensure that it makes a difference.

Box 3: Mexico's Insertion in Global Supply Chains:

The Challenge of Adding Mexican Value

Mexico has outperformed most of its Latin American peers when it comes to participating in global supply chains, particularly with North America (see Chap. 2). Proximity, low trade barriers, and low factor prices relative to the US and Canada, among other factors, have made Mexico an attractive destination for firms in the North seeking to engage in cross-border production sharing. Accordingly, Mexico stands apart in Latin America in the ability of its firms to join international production networks.

Mexico has also been pursuing policies for many years to foster such international linkages. The Maquiladora program, for instance, started in the mid-1960s to allow imports from the US to enter duty-free as long as the output from the Maquiladora firms was exported back to the US. The program later incorporated other tax benefits. The Program of Temporary Imports to Produce Export Goods was another major initiative that had objectives similar to the Maquiladora program. In 2006 both programs were combined to form the Manufacturing Industry, Maquiladora and Export Services Program (IMMEX). IMMEX permits the temporary import of inputs, raw materials, parts and components, and machinery and equipment free of duty for use in a production process, as long as the final product is exported. The program also allows for exemption from the value-added tax. Today, Mexico's processing exports through the IMMEX program represent around 63 % of the country's total exports.

(continued)

Box 3: (continued)

Despite all these efforts, there is a general perception that Mexico's insertion in supply chains has been mostly in assembly operations and that efforts should be made to incorporate additional domestic value in the international production networks in which the country participates. For example, combining input-output tables with trade data, De La Cruz, Koopman, and Wang (2011) show that the domestic value added embodied in Mexico's processing exports is only 23 %.²³ To provide further insights on this issue we conducted an analysis based on plant-level data that enables us to track the evolution of the share of domestic value added over time in processing exports. An increase in this measure, for example, might signal that more segments of the supply chains are moving into Mexico.

We use the IMMEX census conducted by Mexico's National Institute of Statistics and Geography, which provides information for all the plants that participate in the IMMEX program. The census covers 6,400 establishments, of which approximately 5,200 are engaged in manufacturing. We examine monthly data covering the period July 2007 to January 2013.²⁴

We first calculate the overall share of domestic value added in total processing exports at the country level as the weighted average of the share of each establishment.^{25,26} Figure 4.5 shows the result. While there are various episodes with noticeable changes, in general there is a decreasing trend.

²³ This share of domestic value is much lower than the 56 % share implied by our analysis in Chap. 2. Note, however, that the share of domestic value added of 23 % is only for processing exports. According to De La Cruz et al. (2011), the share of domestic value added for all the exports of Mexico is 45 %, a value much closer to our results but still somewhat smaller. Computations regarding trade in value added can differ greatly depending on the assumptions made and the trade data and input-output tables employed in the analysis. Our results for Mexico in Chap. 2 are closer to the 52 % reported by Koopman, Wang, and Wei (2014) because the assumptions and the databases that we use are more similar to that analysis, as explained in appendix A "Trade in Value Added and Set of Countries".

²⁴ We are grateful to INEGI's staff for kindly running our statistical and econometric codes in their computers.

²⁵ The weight is the participation of each establishment's processing exports in the total processing exports of the country.

²⁶ The IMMEX census does not provide information on the value of processing exports; however, there is information regarding the domestic value added incorporated in the processing exports, as well as regarding the value of the foreign inputs used in them. Therefore, we proxy the value of the processing exports by adding these two variables. We then calculate the share of domestic value added for each establishment as the ratio of the domestic value added incorporated in the processing exports over the sum of the domestic value added and the value of the foreign inputs.

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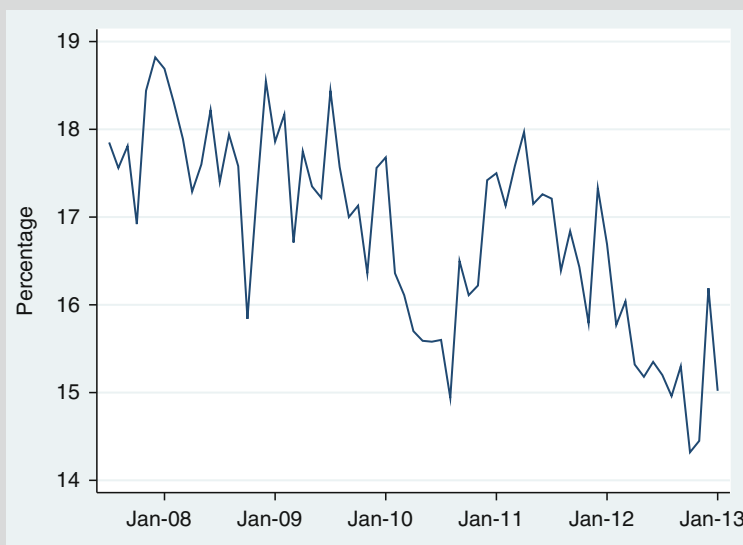
Box 3: (continued)

Fig. 4.5 Mexico's share of domestic value added in processing exports. *Source:* Authors' calculation based on the IMMEX census, with support from INEGI

A decline in the overall share of domestic value added of the country, however, does not necessarily mean that the firms are reducing the local value added incorporated in their exports. A decline could result from changes in the participation of each establishment in the total exports of the country. For instance, if establishments with large domestic value added were losing participation in the total level of processing exports while the establishments with low value added were gaining participation, we would see a decline in the overall share of domestic value added.

To analyze whether the drop in overall share of domestic value added is due to within-firm reduction in the share of domestic value added, or to changes in the firm's participation in total processing exports (including firm entry and exit), we follow Kee and Tang (2012) and estimate an equation that relates the share of the domestic value added of each establishment against firm and year variables. A within-firm decline in the share of domestic value added will be captured by a decreasing estimated coefficient for the year variable. We repeat this exercise after recalculating the share of domestic value added using real instead of nominal series.²⁷

²⁷ We use INEGI's monthly production price index to deflate the domestic value added using July 2007 as the baseline date. For the value of foreign inputs we first convert the imports from pesos to US dollars using the monthly nominal exchange rate. Then, we convert them

(continued)

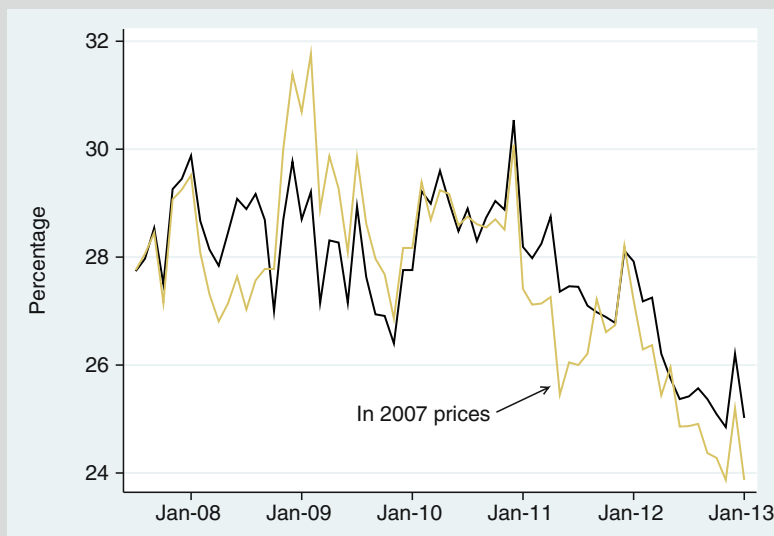
Box 3: (continued)

Fig. 4.6 Within-firm evolution of share in domestic value added. *Source:* Authors' calculation based on the IMMEX census, with support from INEGI

In Fig. 4.6, the within-firm changes in the shares of domestic value added are represented by the black line. The brown line presents the results when using July 2007 prices. A declining trend is evident in both cases.

Both figures in this box generally indicate that the share of domestic value added in the country's processing exports has declined during the last 5 years, and that this decline is not the result of market share reallocations. The typical firm engaged in processing exports has reduced its domestic value added by about 3 % points during this period. While certainly this is not a large decline, it is clear that the share of domestic value added is not increasing, a finding that suggests that in recent years, Mexico has not been able to incorporate additional local content in the international supply chains in which the country participates. However, the finding is only a general trend and does not necessarily apply to all the sectors of the economy. Further research will be needed to explore the evolution of the Mexican domestic value added at more detailed sectorial levels and to pin down the precise forces behind these trends.

back into pesos using the nominal exchange rate of July 2007, which gives us a series for imports in July 2007 prices. We then recalculate the share of domestic value added for each establishment, as mentioned in the previous footnote.

Exploit Synergies Through a Coordinated Approach

In this chapter we have presented examples of policies aimed at alleviating information and coordination problems that affect participation in GVCs. Certainly these are not the only policies, and many others have been proposed.²⁸ Examining every policy is beyond the scope of this chapter. The aim of this section is to emphasize the importance of coordinating policies and programs in order to take advantage of potential complementarities and synergies among them.

The rationale for pursuing a coordinated approach is rooted in the notion that accession to international production networks might be hampered by multiple market failures, and the possibility that suboptimal outcomes might arise when market failures in different areas are not addressed in a structured and consistent way (Blyde et al., 2014). Interventions should then be coordinated to take advantage of their complementarities.

Of course, this is easier said than done. Coordination of policies might be hard to achieve, particularly when different agencies are involved. Differences among agencies in terms of mandates, strategic views, agendas, or bureaucratic processes reduce possibilities for coordination. But this does not mean that all efforts are doomed to fail. Certain institutional arrangements might encourage more coordination than others. Examples of such institutional arrangements are presented now, even though they are not all strictly related to participation in GVCs.

One example is a centralized organization that performs several different tasks. Here, the problem of coordination is addressed by outright integration. This path has been taken by several countries that have merged their export and investment promotion organizations into a single agency to better exploit complementarities that could arise from addressing information and coordination problems. Examples can be found in Australia (AUSTRADE), Korea (KOTRA), Colombia (PROEXPORT), Germany (GTAI), and Finland (FINPRO).

Another alternative for achieving coordination is the cross-membership of officials of the relevant agencies in their respective boards. For instance, a representative from TEKES, the Finnish innovation promotion agency, is a member of FINPRO's board (Volpe Martincus, 2010).

Another approach would be to create a body, within the government, charged with coordinating the efforts of various agencies, an approach that some countries have taken as a way to foster competitiveness. Such coordinating bodies could consist of representatives of different agencies, meet on a regular basis, and be chaired by a high-ranking official—even the president—to ensure relevance. A new body does not necessarily need to be created exclusively for GVCs, particularly if the government can employ an existing focal point that already incorporates the relevant agencies.

Other alternatives are also possible. In each case, the optimal institutional arrangement would ultimately be determined by factors specific to individual countries.

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²⁸ Pietrobelli and Staritz (2013) offer an insightful typology of interventions in GVCs.